WHAT IS CLAIMED IS:

1. A method of determining a network performance metric in a network, wherein said network comprises a plurality of network elements and each one of said network elements is coupled to at least one other of said network elements by at least one of a plurality of links, comprising:

measuring a measured network performance metric between a first network element and a second network element of a network element pair in a first set of network element pairs, wherein

said first network element and said second network element of said network element pair in said first set of network element pairs is included in said network elements, and

said measured network performance metric is such that a computed network performance metric between a first network element and a second network element of said network elements can be computed using said measured network performance metric.

2. The method of claim 1, wherein

said computed network performance metric can be computed between a first network element and a second network element of a network element pair in a second set of network element pairs using said measured network performance metric, and

said first network element and said second network element of said network element pair in said second set of network element pairs is included in said network elements.

3. The method of claim 2, further comprising:

computing said computed network performance metric between said first network element and said second network element of said network element pair in said second set of network element pairs, wherein

said second set of network element pairs are included in said network elements, and

said first set of network element pairs is included in a second set of network element pairs.

4. The method of claim 3, further comprising:

identifying pairs of said network elements as being in said second set of network element pairs; and

identifying pairs of said network elements in said second set of network element pairs as being in said first set of network element pairs.

5. The method of claim 4, further comprising:

generating a first matrix using said second set of network element pairs, wherein

each row in said first matrix corresponds to a corresponding network element pair in said second set of network element pairs,

said first matrix comprises independent rows and non-independent rows,

said first set of network element pairs contains independent network element pairs in said second set of network element pairs, and

each one of said independent pairs of network element corresponds to a one of said independent rows of said first matrix.

6. The method of claim 5, wherein said measured network performance metric is measured between a first network element and a second network element of each network element pair in said first set of network element pairs.

7. The method of claim 5, said method further comprising:

computing a number, wherein said number is equal to a rank of said first matrix;

determining if a first said number of rows of said first matrix are independent; and

if said first said number of said rows of said first matrix are not independent,
re-arranging said rows of said first matrix such that said first said number of said rows of said first matrix are independent.

8. The method of claim 7, further comprising:
identifying a maximal set of independent rows of said first matrix based on said number.

9. The method of claim 7, wherein said rearranging further comprises:
re-arranging said pairs of said network elements in said second set of network element pairs such that said correspondence between each row of said first matrix and said corresponding network element pair in said second set of network element pairs is maintained.

10. The method of claim 9, wherein said forming said first set of network element pairs comprises:
copying a first said number of pairs of said network elements in said second set of network element pairs into said first set of network element pairs.

11. The method of claim 5, wherein
said network element pair in said second set of network element pairs is a remaining network element pair in said second set of network element pairs, and
said remaining network element pair corresponds to a non-independent row of said first matrix

12. The method of claim 6, wherein said computing said computed network performance metric between said first network element and said second network element of said remaining network element pair comprises:
forming a second matrix, wherein

each row of said second matrix corresponds to a corresponding one of said non-independent rows of said first matrix, and

said each row of said second matrix is such that said corresponding one of said non-independent rows of said first matrix can be expressed in terms of said independent rows using said each row of said second matrix;

organizing said measured network performance metrics into a vector; and

computing said computed network performance metric between said first network element and said second network element of said remaining network element pair by multiplying said vector by a row of said second matrix corresponding to said remaining network element pair.

13. The method of claim 6, wherein said computing said computed network performance metric between said first network element and said second network element of said remaining network element pair comprises:

creating a vector equivalent to said non-independent row of said first matrix by combining a plurality of said independent rows of said first matrix; and

computing said computed network performance metric by combining a measured network performance metric of each network element pair of said first set of network element pairs corresponding to one of said plurality of said independent rows of said first matrix.

14. A method of determining a network performance metric in a network, wherein said network comprises a plurality of network elements and each one of said network elements is coupled to at least one other of said network elements by at least one of a plurality of links, comprising:

identifying pairs of said network elements as being in a first set of network element pairs;

generating a first matrix from said first set of network element pairs, wherein each row in said first matrix corresponds to a corresponding network element pair in said first set of network element pairs, and

said first matrix comprises independent rows and non-independent rows;

forming a second set of network element pairs, wherein said second set of network element pairs contains independent network element pairs in said first set of network element pairs, and each one of said independent pairs of network element corresponds to a one of said independent rows of said first matrix;

measuring a measured network performance metric between a first network element and a second network element of each network element pair in said second set of network element pairs; and

computing a computed network performance metric between a first network element and a second network element of a remaining network element pair in said first set of network element pairs using at least one of said measured network performance metrics, wherein said remaining network element pair corresponds to a non-independent row of said first matrix.

15. The method of claim 14, wherein said first set of network element pairs is a requirements set.

16. The method of claim 15, wherein said second set of network element pairs is a measurements set.

17. The method of claim 16, wherein each one of said network elements is a router.

18. The method of claim 14, wherein said first matrix is a matrix F.

19. The method of claim 14, said method further comprising:

computing a number, wherein said number is equal to a rank of said first matrix;

determining if a first said number of rows of said first matrix are independent; and

if said first said number of said rows of said first matrix are not independent, re-arranging said rows of said first matrix such that said first said number of said rows of said first matrix are independent.

20. The method of claim 19, further comprising:

identifying a maximal set of independent rows of said first matrix based on said number.

21. The method of claim 19, wherein said rearranging further comprises:

re-arranging said pairs of said network elements in said first set of network element pairs such that said correspondence between each row of said first matrix and said corresponding network element pair in said first set of network element pairs is maintained.

22. The method of claim 21, wherein said forming said second set of network element pairs comprises:

copying a first said number of pairs of said network elements in said first set of network element pairs into said second set of network element pairs.

23. The method of claim 14, wherein said computing said computed network performance metric between said first network element and said second network element of said remaining network element pair comprises:

forming a second matrix, wherein

each row of said second matrix corresponds to a corresponding one of said non-independent rows of said first matrix, and

said each row of said second matrix is such that said corresponding one of said non-independent rows of said first matrix can be expressed in terms of said independent rows using said each row of said second matrix;

organizing said measured network performance metrics into a vector; and

computing said computed network performance metric between said first network element and said second network element of said remaining network element pair by multiplying said vector by a row of said second matrix corresponding to said remaining network element pair.

24. The method of claim 23, wherein said second matrix is a matrix A.

25. The method of claim 14, wherein said computing said computed network performance metric between said first network element and said second network element of said remaining network element pair comprises:

creating a vector equivalent to said non-independent row of said first matrix by combining a plurality of said independent rows of said first matrix; and

computing said computed network performance metric by combining a measured network performance metric of each network element pair of said second set of network element pairs corresponding to one of said plurality of said independent rows of said first matrix.

26. The method of claim 14, wherein each one of said network elements is a router.

27. A computer system comprising:

a processor;

a network interface, coupled to said processor and to a network, wherein said network comprises a plurality of network elements and each one of said network elements is coupled to at least one other of said network elements by at least one of a plurality of links;

computer readable medium coupled to said processor; and

computer code, encoded in said computer readable medium, configured to cause said processor to:

identify pairs of said network elements as being in a first set of network element pairs;

generate a first matrix from said first set of network element pairs, wherein

each row in said first matrix corresponds to a corresponding network element pair in said first set of network element pairs, and

said first matrix comprises independent rows and non-independent rows;

form a second set of network element pairs, wherein

said second set of network element pairs contains independent network element pairs in said first set of network element pairs, and

each one of said independent pairs of network element corresponds to a one of said independent rows of said first matrix;

measure a measured network performance metric between a first network element and a second network element of each network element pair in said second set of network element pairs; and

compute a computed network performance metric between a first network element and a second network element of a remaining network element pair in said first set of network element pairs using at least one of said measured network performance metrics, wherein said remaining network element pair corresponds to a non-independent row of said first matrix.

28. The computer system of claim 27, wherein said first set of network element pairs is a requirements set.

29. The computer system of claim 28, wherein said second set of network element pairs is a measurements set.

30. The computer system of claim 29, wherein each one of said network elements is a router.

31. The computer system of claim 27, wherein said first matrix is a matrix F.

32. The computer system of claim 27, wherein said computer code is further configured to cause said processor to:

compute a number, wherein said number is equal to a rank of said first matrix;

determine if a first said number of rows of said first matrix are independent; and

if said first said number of said rows of said first matrix are not independent, re-arrange said rows of said first matrix such that said first said number of said rows of said first matrix are independent.

33. The computer system of claim 32, wherein said computer code is further configured to cause said processor to:

identify a maximal set of independent rows of said first matrix based on said number.

34. The computer system of claim 32, wherein said computer code configured to cause said processor to re-arrange said rows of said first matrix such that said first said number of said rows of said first matrix are independent, if said first said number of said rows of said first matrix are not independent, is further configured to cause said processor to:

re-arrange said pairs of said network elements in said first set of network element pairs such that said correspondence between each row of said first matrix and said corresponding network element pair in said first set of network element pairs is maintained.

35. The computer system of claim 34, wherein said computer code configured to cause said processor to form said second set of network element pairs is configured to cause said processor to:

copy a first said number of pairs of said network elements in said first set of network element pairs into said second set of network element pairs.

36. The computer system of claim 27, wherein said computer code configured to cause said processor to compute said computed network performance metric between said first network element and said second network element of said remaining network element pair is configured to cause said processor to:

form a second matrix, wherein

each row of said second matrix corresponds to a corresponding one of said non-independent rows of said first matrix, and

said each row of said second matrix is such that said corresponding one of said non-independent rows of said first matrix can be expressed in terms of said independent rows using said each row of said second matrix;

organize said measured network performance metrics into a vector; and

compute said computed network performance metric between said first network element and said second network element of said remaining network element pair by multiplying said vector by a row of said second matrix corresponding to said remaining network element pair.

37. The computer system of claim 36, wherein said second matrix is a matrix A.

38. The computer system of claim 27, wherein said computer code configured to cause said processor to compute said computed network performance metric between said first network element and said second network element of said remaining network element pair is further configured to configured to cause said processor to:

create a vector equivalent to said non-independent row of said first matrix by combining a plurality of said independent rows of said first matrix; and

compute said computed network performance metric by combining a measured network performance metric of each network element pair of said second set of network element pairs corresponding to one of said plurality of said independent rows of said first matrix.

39. The computer system of claim 27, wherein each one of said network elements is a router.

40. A computer program product encoded in computer readable media, said computer program product comprising:

a first set of instructions, executable on a computer system, configured to identify pairs of said network elements as being in a first set of network element pairs, wherein

said computer system is coupled to a network, wherein said network comprises a plurality of network elements and each one of said network elements is coupled to at least one other of said network elements by at least one of a plurality of links;

a second set of instructions, executable on said computer system, configured to generate a first matrix from said first set of network element pairs, wherein

each row in said first matrix corresponds to a corresponding network element pair in said first set of network element pairs, and

said first matrix comprises independent rows and non-independent rows;

a third set of instructions, executable on said computer system, configured to form a second set of network element pairs, wherein said second set of network element pairs contains independent network element pairs in said first set of network element pairs, and each one of said independent pairs of network element corresponds to a one of said independent rows of said first matrix;

a fourth set of instructions, executable on said computer system, configured to measure a measured network performance metric between a first network element and a second network element of each network element pair in said second set of network element pairs; and

a fifth set of instructions, executable on said computer system, configured to compute a computed network performance metric between a first network element and a second network element of a remaining network element pair in said first set of network element pairs using at least one of said measured network performance metrics, wherein said remaining network element pair corresponds to a non-independent row of said first matrix.

41. The computer program product of claim 40, wherein said first set of network element pairs is a requirements set.

42. The computer program product of claim 41, wherein said second set of network element pairs is a measurements set.

43. The computer program product of claim 42, wherein each one of said network elements is a router.

44. The computer program product of claim 40, wherein said first matrix is a matrix F.

45. The computer program product of claim 44, further comprising:

a sixth set of instructions, executable on said computer system, configured to compute a number, wherein said number is equal to a rank of said first matrix;

a seventh set of instructions, executable on said computer system, configured to determine if a first said number of rows of said first matrix are independent; and

an eighth set of instructions, executable on said computer system, configured to re-arrange said rows of said first matrix such that said first said number of said rows of said first matrix are independent, if said first said number of said rows of said first matrix are not independent.

46. The computer program product of claim 45, further comprising:

a ninth set of instructions, executable on said computer system, configured to identify a maximal set of independent rows of said first matrix based on said number.

47. The computer program product of claim 45, wherein said eighth set of instructions comprises:

a first sub-set of instructions, executable on said computer system, configured to re-arrange said pairs of said network elements in said first set of network element pairs such that said correspondence between each row of said first matrix and said corresponding network element pair in said first set of network element pairs is maintained.

48. The computer program product of claim 47, wherein said third set of instructions comprises:

a second sub-set of instructions, executable on said computer system, configured to copy a first said number of pairs of said network elements in said first set of network element pairs into said second set of network element pairs.

49. The computer program product of claim 40, wherein said fifth set of instructions comprises:

a first sub-set of instructions, executable on said computer system, configured to form a second matrix, wherein

each row of said second matrix corresponds to a corresponding one of said non-independent rows of said first matrix, and

said each row of said second matrix is such that said corresponding one of said non-independent rows of said first matrix can be expressed in terms of said independent rows using said each row of said second matrix;

a second sub-set of instructions, executable on said computer system, configured to organize said measured network performance metrics into a vector; and

an third sub-set of instructions, executable on said computer system, configured to compute said computed network performance metric between said first network element and said second network element of said remaining network element pair by multiplying said vector by a row of said second matrix corresponding to said remaining network element pair.

50. The computer program product of claim 49, wherein said second matrix is a matrix A.

51. The computer program product of claim 40, wherein said fifth set of instructions comprises:

a first sub-set of instructions, executable on said computer system, configured to create a vector equivalent to said non-independent row of said first matrix by combining a plurality of said independent rows of said first matrix; and

a second-subset of instructions, executable on said computer system, configured to compute said computed network performance metric by

combining a measured network performance metric of each network element pair of said second set of network element pairs corresponding to one of said plurality of said independent rows of said first matrix.

52. The computer program product of claim 40, wherein each one of said network elements is a router.

53. A computer system comprising:

a network interface, coupled to said processor and to a network, wherein said network comprises a plurality of network elements and each one of said network elements is coupled to at least one other of said network elements by at least one of a plurality of links;

means for identifying pairs of said network elements as being in a first set of network element pairs;

means for generating a first matrix from said first set of network element pairs, wherein

each row in said first matrix corresponds to a corresponding network element pair in said first set of network element pairs, and

said first matrix comprises independent rows and non-independent rows;

means for forming a second set of network element pairs, wherein

said second set of network element pairs contains independent network element pairs in said first set of network element pairs, and

each one of said independent pairs of network element corresponds to a one of said independent rows of said first matrix;

means for measuring a measured network performance metric between a first network element and a second network element of each network element pair in said second set of network element pairs; and

means for computing a computed network performance metric between a first network element and a second network element of a remaining network element pair in said first set of network element pairs using at least one of said measured network performance metrics, wherein said remaining

network element pair corresponds to a non-independent row of said first matrix.

54. The computer system of claim 53, further comprising:

compute a number, wherein said number is equal to a rank of said first matrix;

means for determining if a first said number of rows of said first matrix are independent; and

means for re-arranging said rows of said first matrix such that said first said number of said rows of said first matrix are independent, if said first said number of said rows of said first matrix are not independent.

55. The computer system of claim 54, wherein said computer code is further configured to cause said processor to:

means for identifying a maximal set of independent rows of said first matrix based on said number.

56. The computer system of claim 54, wherein said means for re-arranging said rows of said first matrix such that said first said number of said rows of said first matrix are independent, if said first said number of said rows of said first matrix are not independent, further comprises:

means for re-arranging said pairs of said network elements in said first set of network element pairs such that said correspondence between each row of said first matrix and said corresponding network element pair in said first set of network element pairs is maintained.

57. The computer system of claim 56, wherein said means for forming said second set of network element pairs further comprises:

means for copying a first said number of pairs of said network elements in said first set of network element pairs into said second set of network element pairs.

58. The computer system of claim 53, wherein said means for computing said computed network performance metric between said first network element and said second network element of said remaining network element pair further comprises:

means for forming a second matrix, wherein

each row of said second matrix corresponds to a corresponding one of said non-independent rows of said first matrix, and

said each row of said second matrix is such that said corresponding one of said non-independent rows of said first matrix can be expressed in terms of said independent rows using said each row of said second matrix;

means for organizing said measured network performance metrics into a vector; and

means for computing said computed network performance metric between said first network element and said second network element of said remaining network element pair by multiplying said vector by a row of said second matrix corresponding to said remaining network element pair.

59. The computer system of claim 53, wherein said means for computing said computed network performance metric between said first network element and said second network element of said remaining network element pair further comprises:

means for creating a vector equivalent to said non-independent row of said first matrix by combining a plurality of said independent rows of said first matrix; and

means for computing said computed network performance metric by combining a measured network performance metric of each network element pair of said second set of network element pairs corresponding to one of said plurality of said independent rows of said first matrix.